LOL-HECO-IR-76

Ref: "realistically we need to be especially cautious about Waikiki, our state's main economic engine." (T-4, page 39, lines 1-2)

Question(s):

HECO maintains two types of distribution grids (radial grid: customers can get their power from one substation; network grid: customers get their power from two substations). Only Downtown Honolulu has the stronger, more robust, grid distribution system.

a. Since most outages occur on the distribution system, if the goal was to prevent outages in Waikiki, shouldn't Waikiki's distribution system be upgraded from a radial system to a grid system, so that all customers could get electricity from more than one distribution substation?

b. Shouldn't a central generator be built near Waikiki so that in the event of a major system-wide disturbance, Waikiki could be islanded?

c. Since 1966, has Waikiki relied on electricity from only two transmission lines from the Pukele Substation?

d. Has the maximum load at the Pukele Substation decreased from 250 MW in 1986 to less than 200 MW in 2003?

e. In what year did HECO decide that Waikiki needed electricity from a third transmission line?

f. What subtransmission lines provide electricity to Waikiki?

HECO Response:

a. The goal of the Kamoku 46kV Underground Alternative – Expanded is to resolve several issues (i.e., Koolau/Pukele Overload Situation, Downtown Overload Situation, Pukele Substation Reliability Concern, and Downtown Substation Reliability Concern) and not only to prevent outages in Waikiki. These issues are discussed in HECO T-4.

b. A central generator in Waikiki has not been evaluated by HECO. Please also refer to the response to CA-IR-19. In addition, there are other critical loads, which would experience a loss of service if the two 138kV transmission lines serving the Pukele Substation were

unavailable. In a hypothetical situation where a large generator in the Pukele Service area were used to serve the loads in Waikiki and provide back-up service to other areas served by the Pukele Substation, several factors should be considered. For example:

- Space requirements and land consideration for a 200 MW unit (approximate amount of load served by the Pukele Substation at the time of the 2002 Day Peak) including fuel storage facilities, cooling facilities and resources and maintenance facilities for the generator,
- Routes for various transmission (if power is exported from the generator at 138kV) or sub-transmission (if power is exported from the generator at 46kV) lines connecting to existing 138kV and/or 46kV systems serving the Pukele Service area,
- Permitting requirements (and the uncertainties associated with attaining permits) for the generator and the transmission/sub-transmission lines
- Staffing requirements for the generator facility for operation and maintenance
- Timing for the generator – can the generator be installed to address the near-term Koolau/Pukele Line Overload Situation?

c. Yes. However, HECO has taken steps to improve the reliability of the Pukele Substation, which were explained in the response to CA-IR-15, subpart b, and HECO T-4, pages 44-45. HECO also considered installing a third line to the Pukele Substation in 1986, although the scope of the study focused on improving the reliability of the Pukele Substation through bus segmentation, which was considerably lower in cost than installing a third line to the Pukele Substation. Refer to HECO T-4, page 45.

d. The maximum demand for the Pukele Substation in 1986 was 231 MW. The maximum

demand for the Pukele Substation in 2003 was 224 MW. It should be noted that loads will fluctuate within the hour and some of the decrease is due to normal load fluctuations. Changes to the distribution system as described in the response to CA-IR-11 and in HECO T-4, page 44, will also change the demand at the substation.

e. As early as July of 1991, HECO began identifying the need to resolve four transmission issues, including the Pukele Substation Reliability issue, as shown in HECO T-4, page 5.

f. The streets that bound the "Waikiki" area are Kalakaua Avenue, Ala Wai Boulevard, Kapahulu Avenue and Ala Moana Boulevard up to the Hawaii Prince Hotel. This defined area is served by the Waikiki, Kapiolani, Kuhio and a portion of the Kapahulu Substations. The Waikiki area is served by the Pukele 1, Pukele 2, Pukele 4, Pukele 5, Pukele 6 and Pukele 8 46kV circuits, as shown in the diagram in Exhibit 5, page 42.